Patent claims

1. A packaging device for packaging electronic circuit units (102), comprising:

a) a packaging means (100), which surrounds the electronic circuit unit (102) and which is electrically insulating; and

b) particles dispersed in the packaging means (100), said particles having a high thermal conductivity,

characterized
in that
c) the particles dispersed in the packaging means (100) are formed as nanoelements (101).

2. The device as claimed in claim 1,
characterized
in that the nanoelements (101) forming the dispersed particles are provided as nanotubes.

3. The device as claimed in claim 1,
characterized
in that the nanoelements (101) forming the dispersed particles are provided as silicon nanowires.

4. The device as claimed in claim 2,
characterized
in that the nanotubes are essentially constructed from carbon and formed as carbon nanotubes (CNT).

5. The device as claimed in one of the preceding claims,
characterized

in that the nanoelements (101) forming the dispersed particles are provided with an electrically insulating sheathing layer (106).

6. The device as claimed in one of claims 1 to 4, characterized
in that the nanoelements (101) forming the dispersed particles are functionalized in such a way that electrical conduction properties of the nanoelements (101) are suppressed.

7. The device as claimed in one of claims 1 to 4, characterized
in that the nanoelements (101) forming the dispersed particles are intrinsically doped in such a way that a metallic Π system is eliminated.

8. The device as claimed in claim 7, characterized
in that the nanoelements (101) forming the dispersed particles are provided as carbon nanotubes (CNT) and are intrinsically doped with nitrogen (N) and/or with boron (B) in such a way that the metallic Π system is eliminated.

9. The device as claimed in one of claims 1 to 4, characterized
in that the nanoelements (101) forming the dispersed particles are provided as hetero-nanotubes having a large band gap.

10. The device as claimed in claim 9, characterized
in that the nanoelements (101) forming the dispersed particles are provided as hetero-nanotubes containing boron nitride (BN), boron-carbon nitride (BCN) and/or vanadium pentoxide (V_2O_5).

11. The device as claimed in one of the preceding claims,
characterized
in that the nanoelements (101) forming the dispersed particles are oriented with a longitudinal axis parallel to at least one heat flow which flows between the circuit unit (102) and an outer side of the packaging device.

12. The device as claimed in one of the preceding claims,
characterized
in that the nanoelements (101) forming the dispersed particles have in their longitudinal axes extents which are significantly smaller than a thickness of the packaging means.

13. The device as claimed in claim 5,
characterized
in that the electrically insulating sheathing layer (106) surrounding the nanoelements (101) forming the dispersed particles has a layer thickness in a range of 20 nm to 30 nm.

14. An electrical insulator comprising a packaging device as claimed in one or more of claims 1 to 13.

15. A method for packaging electronic circuit units (102), comprising the steps of:

a) providing a packaging means (100), which is electrically insulating;

b) dispersing particles having a high thermal conductivity in the packaging means (100); and

c) surrounding the electronic circuit unit (102) with the packaging means (100) in which the particles having the high thermal conductivity are dispersed,

characterized
in that
d) the particles dispersed in the packaging means (100) are provided as nanoelements (101).

16. The method as claimed in claim 15,
characterized
in that after surrounding the electronic circuit unit (102) with the packaging means (100) in which the particles having the high thermal conductivity are dispersed, the packaging means is cured.

17. The method as claimed in claim 15,
characterized
in that a heat flow is transported from the circuit unit (102) to an outer side of the packaging device via the packaging means (100) in which the particles having the high thermal conductivity are dispersed, in order to cool the circuit unit (102).

18. The method as claimed in claim 15,
characterized
in that a heat flow is transported from an outer side of the packaging device to the circuit unit (102) via the packaging means (100) in which the particles having the high thermal conductivity are dispersed, in order to heat the circuit unit (102).

19. The method as claimed in claim 15,
characterized
in that the nanoelements (101) forming the dispersed particles are provided as nanotubes.

20. The method as claimed in claim 15, characterized in that the nanoelements (101) forming the dispersed particles are provided as silicon nanowires.

21. The method as claimed in claim 15, characterized in that the nanotubes are essentially produced from carbon in the form of carbon nanotubes (CNT).

22. The method as claimed in one of claims 15 and 19 to 21, characterized in that the nanoelements (101) forming the dispersed particles are coated with an electrically insulating sheathing layer (106).

23. The method as claimed in one of claims 15 and 19 to 21, characterized in that the nanoelements (101) forming the dispersed particles are functionalized in such a way that electrical conduction properties of the nanoelements (101) are suppressed.

24. The method as claimed in one of claims 15 and 19 to 21, characterized in that the nanoelements (101) forming the dispersed particles are intrinsically doped in such a way that a metallic Π system is eliminated.

25. The method as claimed in claim 24, characterized in that the nanoelements (101) forming the dispersed particles are provided as carbon nanotubes (CNT) and are intrinsically doped with nitrogen (N) and/or with boron

(B) in such a way that the metallic Π system is eliminated.

26. The method as claimed in one of claims 15 and 19 to 21,
characterized
in that the nanoelements (101) forming the dispersed particles are provided as hetero-nanotubes having a large band gap.

27. The method as claimed in claim 26,
characterized
in that the nanoelements (101) forming the dispersed particles are provided as hetero-nanotubes containing boron nitride (BN), boron-carbon nitride (BCN) and/or vanadium pentoxide (V_2O_5).

28. The method as claimed in one of claims 15 to 27,
characterized
in that the nanoelements (101) forming the dispersed particles are oriented with a longitudinal axis parallel to at least one heat flow which flows between the circuit unit (102) and an outer side of the packaging device.

29. The method as claimed in one of claims 15 to 28,
characterized
in that the nanoelements (101) forming the dispersed particles have in their longitudinal axes extents which are significantly smaller than a thickness of the packaging means.